

**U.S. Department of Energy  
Los Alamos Area Office  
And  
LANL Environment, Safety, and Health  
Coordinated Report**

**Progress Report on  
DOE Secretary Initiatives  
for  
Los Alamos National Laboratory**

December 1997

## 1.0 INTRODUCTION

This progress report is in response to the 4 August 1997 memorandum from Department of Energy Secretary Peña that outlined DOE initiatives in response to the explosion at Hanford's plutonium reclamation facility. Subsequent to the Secretary's memorandum, DOE/AL Occupational Safety and Health Division (OSHD) issued the following three memoranda:

Date	Subject	Directive(s)
14 August 1997	DOE/AL Response to the May 14, 1997 Explosion at Hanford's Plutonium Reclamation Facility	• A report addressing the identified initiatives [in the Secretary's memorandum] for your site ... by 12 Dec. 1997.
22 September 1997	DOE/AL Response to the May 14, 1997 Explosion at Hanford's Plutonium Reclamation Facility	• An assessment of known vulnerabilities ... no later than 26 November 1997. • A progress report ... on implementation of the initiatives contained [in the Secretary's] memorandum. {A reminder about the 14 August 1997 memorandum deadline.}
7 November 1997	Secretarial Memorandum on the Assessment of Hazards Associated with Chemical and Radioactive Waste Storage Tanks and Ancillary Equipment	• All waste storage tanks be identified, fully characterized, and addressed in the November [assessment] status report.

The assessment that follows is the result of coordinated efforts by subject matter experts from the DOE Los Alamos Area Office (DOE/LAAO) and the Los Alamos National Laboratory (LANL or Laboratory).

This document describes the progress in evaluation and correction of findings (if any) for the four initiatives at Los Alamos National Laboratory. Sections 2.0 through 5.0 address each of the four initiatives. The text in bold following each section title is the initiative language from the 4 August 1997 memorandum.

### 1.1 Abbreviations

D&D Decontamination and decommissioning

TA [LANL] Technical Area

## **2.0 CHEMICAL USE OR STORAGE**

DOE site contractors must scrutinize their use or storage of any chemicals that have the potential for explosion, fire, or significant toxic release, and must promptly dispose of unneeded chemicals in accordance with safety requirements and environmental regulations. DOE field offices should develop an approval process to assure the disposal or safe and environmentally compliant storage and handling of such chemicals that are retained.

### **2.1 *Excess or Unnecessary Chemicals***

An analysis was conducted to determine if excessive amounts of chemicals were being stored at LANL facilities. The LANL Industrial Hygiene and Safety Group (ESH-5) used the Automated Chemical Information System (ACIS) to query for chemical, chemical location, and amount. The resulting list was reviewed for chemicals in excess of 100 pounds or the OSHA Process Safety Management threshold quantity (TQ). Twenty (20) chemicals appeared to be in excess of the TQ. Walkdowns of the facilities were conducted with the assistance of the Facility Representatives and LANL ESH-5 Industrial Hygienist as part of a quality control check against this review. The walkdowns confirmed that the database is indicating a cumulative amount, not current amounts. (That is, ACIS is reconciled on an annual basis to account for chemical consumption or disposal.) No chemicals in excess of a TQ were found and no unneeded chemicals were identified.

### **2.2 *Approval Process For Chemical Disposal, Storage, & Handling***

DOE/LAAO is developing an approval process based on the Federal Compliance Guide published by the Environmental Resource Management (ERM) Group. Module H-1, Hazardous Materials, and module MH-1, Material Handling, will be used. Both modules contain an approval method specifically based on the pertinent federal regulations, pre-visit preparation checklists, hazardous materials rulebook data, and a scoresheet for rating the processes.

## **3.0 REASSESSMENT OF KNOWN VULNERABILITIES**

DOE field offices must reassess known vulnerabilities (chemical and radiological) at facilities that have been shutdown, are being deactivated, or have otherwise changed their conventional mode of operation in the last several years, and report status to their Program Secretarial Officers and the Assistant Secretary for Environment, Safety and Health within 120 days. Facility operators must evaluate their facilities and operations for new vulnerabilities on a continuing basis.

*The text of this section repeats portions of the information previously transmitted in the 26 November 1997 report, "Assessment of Chemical & Radiological Vulnerabilities in Facilities at Los Alamos National Laboratory."*

### **3.1 *CHEMICAL SAFETY VULNERABILITY REPORT STATUS***

The two generic vulnerabilities identified as requiring action during preparation of the Chemical Safety Vulnerability Review comprehensive site response plan in 1996 remain open. The vulnerabilities were: Condition of Facilities and Safety Systems, and Inventory Control and

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### Tracking.

#### 3.1.1 Condition of Facilities and Safety Systems

Surveillance and maintenance activities are continuing for facilities and systems coming under this vulnerability. Activity data sheets have been submitted, but the priority scores have remained below the funding line.

#### 3.1.2 Inventory Control and Tracking

Three activities were planned with respect to the LANL Automated Chemical Inventory System (ACIS). The proposed activities are shown in italicized text, with the status shown in regular text.

? *Review other chemical management systems for ideas that can be adapted or adopted into ACIS. In particular, evaluate newer generation software that can provide a graphical user interface to ACIS and involve users in new screen designs and functions.*  
A review team has been assembled with representatives from ESH Division, Business Operations (BUS) Division, Computing, Information, and Communications Division, DOE/LAAO, and users such as Engineering Sciences & Applications Division, Materials Science and Technology (MST) Division, Chemical Science and Technology Division (including CMR), and Johnson Controls, Inc. (the local support services subcontractor). Chemical tracking database systems from Pacific Northwest National Laboratory and American Management Systems, Inc. have been identified. Review is ongoing for these and other systems. ACIS will remain largely unchanged in the short-term (six months to one year). Identified enhancements will be planned and phased into the ACIS process to minimize disruptions.

? *Pursue modification of the chemical procurement system so that chemical information screens precede procurement screens to ensure that future changes in procurement procedures do not break data links with ACIS.*

All chemicals in the Just-in-Time purchase catalogs have been identified and flagged. These flags will allow the LANL BUS Division to present chemical purchasers with supplemental ordering screens to collect ACIS-specific information at the time of the order. (It should be noted that missing information has been routinely identified and captured during chemical receiving activities.)

? *Form a team from ESH and BUS divisions to review Gas Plant operations related to gas cylinder tracking.*

The Gas Plant ACIS process has been extensively revised and newly implemented. Now all Gas Plant products are received into ACIS. The LANL Industrial Hygiene and Safety Group is conducting monthly quality assurance on the Gas Plant ACIS records.

### **1.2 Engineering Controls — Ventilation Systems**

Recently, Los Alamos National Laboratory learned of a calibration error in its performance testing procedure for local exhaust ventilation systems. All air velocity measuring instruments had been routinely calibrated to standard conditions (760 mm Hg [29.92 inches Hg], 21 °C [70 °F]), whereas LANL is located at an altitude of 7,400 feet. At this elevation, the corresponding

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atmospheric pressure is about 585 mm Hg. The result was that the measured air velocities were below the actual values. For a more complete background and description of requirements, please refer to the attached "Notice" (Attachment 1).

In addition to the requirements contained in the Notice, LANL took the action to notify Facility Managers by email. The performance testing procedure has been revised and reissued, and the document is available on the LANL Intranet. Instruments are still calibrated to standard conditions, but the measurements are corrected to the actual values. (The calibration to actual conditions at LANL exceeds the adjustment span available to the user. The instrument manufacturers have refused to modify the instruments to allow a greater span.) It should be noted that the performance testing procedures have always called for evaluation of higher velocity systems by an industrial hygienist.

### 1.3 Walkdown Results

The following table summarizes the results:

TABLE 4.1 Confirmatory Walkdown Summary		
FACILITY	HAZARD TYPE	STATUS
TA-3, Bldg. 16 (IBF)	Rad/Chem	Decommissioned. Tritium contamination (targets). Storage area in basement. Building locked.
TA-3, Bldg. 29 (CMR)	Rad/Chem	See paragraph below on CMR.
TA-6, Bldgs. TM-1 through TM-9	Rad/Chem <sup>(1)</sup>	No materials in facility. Small amounts of asbestos containing materials (ACM) were present.
TA-8, Bldgs. 1, 2, 3	Rad/Chem	No materials in facility. HE contamination in drains.
TA-15, Bldg. 23	Chem	Stand-down. No chemicals.
TA-16, Bldgs. 7 & 10	Chem	No materials in facility.
TA-16, Bldg. 27	Chem	Building being torn down now.
TA-16, Bldg. 58	Chem	Contaminated HE line removed.
TA-16, Bldgs. 90, 91, 92	Chem	Buildings removed.
TA-16, Bldg. 101	Chem	Building removed.
TA-16, Bldg. 370	Chem	Oxygen and nitrogen cylinders in place on loading dock. Machines in place.
TA-16, Bldgs. 515, 516, 517	Chem	No materials in facility.
TA-21, Bldg. 150	Rad/Chem	Compressed gas cylinders properly secured outside of facility. Building locked.

Note: 1. Chemical refers to High Explosive work buildings.

#### **1.4 Waste Storage Tanks**

##### **1.4.1 TA3-154**

This structure was identified as a site-specific vulnerability during the Chemical Safety Vulnerability Review. This structure contains four tanks; 2 concrete tanks of approx. 5,000 gallon capacity, and 2 stainless steel tanks of approx. 1,200 gallon capacity.

The two concrete tanks are full, one stainless steel tank is full, and the remaining stainless steel tank is about half full. All four tanks have been fully characterized as presenting only a low level radiation hazard. The contents are predominantly water, and there is no explosion, flammable, or chemical hazard. Plans have been drawn up for disposal of the tank contents, but funding and a schedule have not been identified.

##### **1.4.2 TA21-257**

Work plans have been drawn up and are available to the public in the local Reading Room. The assessment is that this facility poses no concern.

### **4.0 TECHNICAL COMPETENCE OF STAFF**

**DOE and contractor field organizations with operational responsibilities must assess the technical competence of their staffs to recognize the full range of hazards presented by the materials in their facilities, act on results, and implement training programs where needed.**

#### **4.1 DOE/LAO**

DOE/AL conducted gap analysis on the DOE/LAO group and provided a document in April 1997. DOE/LAO completed the training in August 1997. In addition, DOE/LAO also conducted cross-discipline training as part of completing the gap training.

#### **4.2 LANL**

The technical competence of staff is addressed in several areas. Of those, the Laboratory's "Training Implementation Plan and Matrices ..." provides a narrative comparison between the training programs that are ongoing or planned for nuclear facility workers with nuclear activities and the requirements DOE O5480.20A, and establishes a formal agreement between the DOE and LANL on the requirements for these training programs at the Laboratory. This document also outlines the Lab-wide policies on personnel selection, training, and qualification and certification descriptions. Additionally, the competence of other personnel (including support) is addressed through professional certifications, site-specific training requirements, formal education, and a series of other LANL policies addressing requirements for training.

The applicable LANL policies on training are as follows:

- AR 1-4, Environment Safety and Health Training
- AR 1-9, Hazard Communication
- DP 113, Training
- LIR 402-100-02.0, Hazardous Waste Operations and Emergency Response Training Requirements

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- **LS113-12.0 LANL Worker Qualification and Certification**
- **LS113-13.0, On-The-Job Training**
- **LS113-15.0, Training Staff Qualification and Certification**

(AR means Administrative Requirement, DP means [LANL] Director's Policy, LIR means Laboratory [LANL] Implementation Requirement, and LS means Laboratory [LANL] Standard. The LANL document system is being revised to eliminate these multiple document designations.)

ES&H training is provided at various Laboratory levels – institutional, facility, and operation-specific. Laboratory training courses are entered into the Employee Development System (EDS) database. Training plans also are created in EDS to track required training. Like courses, training plans may be established at various levels. Training plan notifications can be activated in either an email or hardcopy reminder to the worker, the supervisor, or the training plan coordinator to indicate upcoming expiration dates in the training plan. The notification is sent 60 days prior to the expiration date and again on the expiration date. The notification indicates to the worker which training plan is affected and which course(s) he/she must take to complete the plan.

Based on the information briefly summarized above, the Laboratory considers its staff to be technically competent, and the systems exist and are in use to identify training needs.

### **5.0 LESSONS LEARNED AND OCCURRENCE REPORTING**

**DOE field offices must assess their site Lessons Learned and Occurrence Reporting programs to assure that 1) outgoing information is well characterized and properly summarized, and 2) incoming information is thoroughly evaluated, properly disseminated, appropriately implemented, and tracked through formal management systems.**

#### **5.1 LANL**

The LANL Lessons Learned and Reporting program is consistent with DOE O232.1 and the LANL Categorization Criteria matrix. Final reports with causal analysis, corrective actions, and lessons learned are submitted by the Laboratory to the ORPS system. The Laboratory provides justification for all changes in target submittal dates to DOE/LAAO in order to obtain DOE approval.

The LANL Lessons Learned and Reporting program is part of the Integrated Safety Management system implementation plan and the LANL Safety Self-assessment policy. In accordance with these objectives, line managers have performed quarterly self-assessments of ORPS reports. These self-assessments are sent to the Laboratory Director, the Deputy Director, the Institutional ES&H Champion, and to ESH Division. Copies of the management self-assessments have also been provided to the University of California and DOE (with limited distribution). A summary of this program performance status is available in the LANL 1997 ES&H Performance Measures Self-Assessment (September 1997).

The recent problem of a calibration error in the LANL performance testing procedure for local exhaust ventilation systems (see Section 3.2) is an example of the LANL Lessons Learned and Reporting program at work. An ORPS report was submitted and a LANL Notice was distributed

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(see Attachment 1).

### **6.0 REFERENCES**

- Secretary Federico Peña's memorandum, 4 August 1997.
- DOE Order 440.1, "Worker Protection Management for DOE Federal and Contractor Employees."
- DOE Order 5500.3A, "Planning and Preparedness for Operational Emergencies."
- DOE Order 151.1, "Comprehensive Emergency Management System."
- "Definitions and Criteria for Accident Analysis," DOE-DP-3005-93.
- DOE Handbook "Process Safety Management for Highly Hazardous Chemicals," Section 3.2. DOE HDBK-1101-96, February 1996.
- DOE Handbook "Chemical Process Hazard Analysis," DOE HDBK-1100-96.
- Title 40 Code of Federal Regulations Part 68, "Accidental Release Prevention Requirements: Risk Management Programs ...."
- Title 29 Code of Federal Regulations Part 1910.119, "Process Safety Management of Highly Hazardous Chemicals."
- Fundamentals of Industrial Hygiene, 4<sup>th</sup> Ed., National Safety Council.
- Threshold Limit Values for Chemical Substances and Physical Agents, American Conference of Governmental Industrial Hygienists (ACGIH), 1997.
- Industrial Ventilation: A Manual of Recommended Practice, 22<sup>nd</sup> Ed., American Conference of Governmental Industrial Hygienists.
- Engineering Field Reference Manual, American Industrial Hygiene Association, (AIHA).
- NIOSH Pocket Guide to Chemical Hazards.

### **7.0 ATTACHMENTS**

Attachment 1: [LANL] Notice: Performance of Laboratory Chemical Fume Hoods ??  
Requirements

### **8.0 CONCLUSIONS / RECOMMENDATIONS**

No new chemical or radiological vulnerabilities were identified. Existing vulnerabilities are being adequately addressed. The buildings and storage areas were adequate and protected by physical barriers and security systems.

These recommendations are based on the data that was available at the time of this evaluation and current standards and guidelines. If there are any questions, please contact:



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# NOTICE

ESH Division

November 4, 1997

Notice No. 0012

## Performance of Laboratory Chemical Fume Hoods—Requirements

### Background

Recently, a critique of chemical fume hood ventilation flow rate measurements was conducted. The concern identified was that the instrumentation being used by Group ESH-5 for the testing of chemical fume hoods had not been calibrated for local conditions (i.e., altitude correction). Consequently, a chemical fume hood with a measured face velocity of 100 feet per minute is actually operating with a face velocity of 130 feet per minute, which is an error on the conservative side. The two areas of concern with regard to these measurements are 1) potential disagreement with stated chemical fume hood face velocities in TSRs or OSRs for nuclear facilities, and 2) hoods with average face velocities (actual) in excess of 150 feet per minute will need additional evaluation by an industrial hygienist. This evaluation is necessary to ensure that unacceptable levels of turbulence at the hood's face is not occurring. Normally, the higher face velocity is not a problem, but there could be some situations where the turbulence is such that contaminants could be emitted into the room air.

In completing the chemical fume hood survey, ESH-5 was to measure the actual face velocity, feet per minute (at Los Alamos conditions). However, it was recently discovered that measurements of face velocities at standard conditions were being collected and reported. This error was due to a calibration procedure applied to the instrumentation used to monitor the chemical fume hoods. While this error has resulted in an underestimation of chemical fume hood face velocities, there is concern that some of the chemical fume hoods may be operating at such a high face velocity that they produce unacceptable air turbulence. Normally, the higher flow rates are not a problem unless this turbulence causes contaminants to be emitted into room air.

Another issue with these chemical fume hood surveys is the Operational Safety Requirements (OSR) and/or Technical Safety Requirements (TSR) applicable to specific facilities. In some cases these TSRs and/or OSRs may define chemical fume hood face velocities that are contrary to the ESH-5 procedure.

### Purpose

This Notice formalizes a response process that includes the following requirements:

- Operating and/or Safety requirements must be reviewed to identify those which define chemical fume hood face velocities. For those facilities where a OSR or TSR violation has occurred, a formal notification process must be initiated.
- All chemical fume hoods must be re-evaluated to identify those where performance is considered unacceptable.

Note: ESH-5 is revising procedures for the monitoring of chemical fume hoods to 1) address instrument calibration at Los Alamos conditions, 2) include information on the evaluation of chemical fume hoods where the face velocity is in excess of established guidelines, and 3) provide guidelines on other issues of concern to be considered in monitoring the performance of chemical fume hoods.

**Responsibilities  
and  
Requirements**

**ESH-5 must:**

- revise the *Performance Testing Procedures, Local Exhaust Ventilation System* document to 1) include performance criteria for acceptable chemical fume hood face velocities at LANL, 2) provide additional guidance for evaluating chemical fume hoods with face velocities in excess of 150 actual feet per minute, and 3) include guidance for evaluating other factors that influence the performance of chemical fume hoods (e.g., adjacent doorways, operable windows, supply air distribution, etc.);
- review the chemical fume hood inventory and identify 1) those operating in excess of 150 actual feet per minute, 2) those classified as conditionally approved, and 3) those where no further evaluation is required. Those chemical fume hoods requiring additional evaluation must be re-surveyed to establish compliance status with revised procedures. Where this re-survey identifies chemical fume hoods that do not meet performance requirements, ESH-5 must notify the appropriate DD/PD/OD (or designee) and Facility Manager and label the chemical fume hood accordingly;
- review information provided by Facility Managers to identify areas where required chemical fume hood performance is not being satisfied. Where there are noncompliance issues identified, this information must be provided to the appropriate Facility Manager, and
- contact ESH-3 to request a review of all OSRs and TSRs to identify noncompliance with any other areas of chemical fume hood monitoring and performance at LANL.

**Facility Manager must:**

- review OSRs and TSRs that apply to their facilities. This review is to identify any areas where the performance of chemical fume hoods is defined. This information must be provided to ESH-5 for evaluation and comparison with performance testing procedures;
- where there are OSR or TSR noncompliance issues, initiate the occurrence reporting process; and
- provide support to chemical fume hood performance testing personnel to enable them to complete necessary evaluations.

**ESH-3 must:**

assist Facility Managers in reviewing all current OSRs and TSRs to identify requirements for chemical fume hood performance.

**USERS must:**

contact their Facility Manager and Group ESH-5 if they have any indications that any of the chemical fume hoods being used have excessively high face velocities which are creating unacceptable turbulence.

The OIC for this notice is ESH-5, 667-5231, and the responsible division director is the ESHDD.

This notice will remain in effect for 180 days. It will be evaluated at that time to determine if the requirements must be included in an LIR.

**Los Alamos**  
National Laboratory